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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Satoru Fukuoka

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EXAMINER

ECHELMeyer, ALIX ELIZABETH

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/669,713	Applicant(s) FUKUOKA ET AL.	
	Examiner Alix Elizabeth Echelmeyer	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-10 is/are pending in the application.
 4a) Of the above claim(s) 1 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-6 and 8-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/7/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of claims 1, 3-6 and 8-10 in the reply filed on November 18, 2008 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Information Disclosure Statement

2. The Information Disclosure Statement filed January 7, 2009 has been considered by the examiner.

Declaration

3. The Declaration filed August 5, 2008 has been considered by the examiner. The arguments presented therein are discussed below, in the Response to Arguments section.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1 and 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. (US 6,063,522) in view of Sano et al. (US 2002/0086 191) and Funatsu (US 5,478,673).

Regarding claim 1, Hamrock et al. teach a non-aqueous electrolytic solution for a lithium cell containing linear ethers such as diethylene glycol dimethyl ether (DMG) (column 13 lines 52-59).

As for applicants' claim 3, Hamrock et al. teach the use of conductive salts in the electrolyte composition (column 11 lines 45-50). Hamrock et al. list lithium bis (trifluoromethanesulfonyl) imide and lithium bis (pentafluoroethanesulfonyl) imide as preferred conductive salts (column 13 lines 20-25).

Regarding claims 4 and 5, Hamrock et al. teach $\text{Li}_x\text{Mn}_2\text{O}_4$ and Li_xMnO_2 as suitable cathode materials (column 14 lines 49-51).

Regarding claim 1, Hamrock et al. fail to teach the use of a separator having a melting point greater than 185 degrees Celsius.

Sano et al. teach the use of a separator in a battery cell that is capable of withstanding high temperatures ([0015]). Sano et al. teach that polyphenylene sulfide may be used as the separator, the same material used as the separator in the specification of the instant invention (claim 4 of Sano et al.).

Sano et al. further teach that the separator would be capable of withstanding high temperatures in order to suppress the vaporization of the electrolyte ([0015]).

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It would be desirable to use the polyphenylene sulfide separator of Sano et al. in the battery of Hamrock et al. in order to suppress the vaporization of the electrolyte.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the polyphenylene sulfide separator of Sano et al. in the battery of Hamrock et al. in order to suppress the vaporization of the electrolyte.

With further regard to claim 1, Hamrock et al. fail to teach a subsidiary component of the non-aqueous electrolyte in the amount of less than 100% by volume.

Funatsu teaches a non-aqueous electrolyte battery having a mixed solvent containing ethylene carbonate and a chain ether (abstract).

The mixed solvent of Funatsu contains 5%-40% ethylene carbonate and 60%-95% of the chain ether (column 3 lines 15-30).

Funatsu further teaches that the mixed solvent improves charge/ discharge capacity by preventing dendrite growth (column 3 lines 7-15).

It would be advantageous to use the blended solvent of Funatsu in the battery of Hamrock et al. in view of Sano et al. since it increases the charge/discharge capacity of the battery by preventing dendrite growth.

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Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the blended solvent of Funatsu in the battery of Hamrock et al. in view of Sano et al. since it increases the charge/discharge capacity of the battery by preventing dendrite growth.

6. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. in view of Sano et al. and Funatsu as applied to claim 4 above, and further in view of Takahashi et al. (US 5,766,791).

The teachings of Hamrock et al., Sano et al. and Funatsu as discussed above are incorporated herein.

Hamrock et al. in view of Sano et al. and Funatsu fail to teach the battery casing assembly of claim 6.

Takahashi et al. teach a battery having an outer casing, a cap, and an insulating gasket (abstract; Figure 1).

Takahashi et al. further teach a safety venting valve in the cap to prevent explosion of the battery due to high internal pressure (abstract).

Takahashi et al. fail to explicitly teach the melting temperature of the gasket, but it is the position of the examiner that the gasket would inherently have a high melting temperature because the case of the battery would not function as intended if the gasket melted prior to the safety vent functioning to release the buildup of internal pressure.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the battery housing of Takahashi et al. in order to provide a safety venting mechanism to prevent explosion.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. in view of Sano et al. and Funatsu as applied to claim 1 above, and further in view of Sakai et al. (US 2002/0122984)

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The teachings of Hamrock et al., Sano et al. and Funatsu as discussed above are incorporated herein.

Hamrock et al. in view of Sano et al. and Funatsu teach the lithium cell of claim 1 but fail to teach that the anode is a lithium-aluminum alloy.

Sakai et al. teach a cell having spinel lithium manganese oxide as the cathode active material and a lithium-aluminum alloy in the anode ([0017], [0022]).

Sakai et al. further teach that the battery having the above described anode and cathode materials has excellent properties at high temperatures.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a lithium-aluminum alloy as taught by Sakai et al. in the battery of Hamrock et al. in view of Sano et al. and Funatsu since the resulting battery would have excellent properties at high temperatures.

8. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamrock et al. in view of Sano et al., Funatsu and Sakai et al. as applied to claim 8 above, and further in view of Takahashi et al.

The teachings of Hamrock et al., Sano et al., Funatsu, Sakai et al. and Takahashi et al. as discussed above are incorporated herein.

Hamrock et al. in view of Sano et al., Funatsu and Sakai et al. teach the claimed battery but fail to teach the claimed housing.

Takahashi et al. teach a battery having an outer casing, a cap, and an insulating gasket (abstract; Figure 1).

Takahashi et al. further teach a safety venting valve in the cap to prevent explosion of the battery due to high internal pressure (abstract).

With regard to claim 10, the inner part of the cap, or explosion-proof valve, is made of aluminum (column 1 lines 23-24).

Takahashi et al. fail to explicitly teach the melting temperature of the gasket, but it is the position of the examiner that the gasket would inherently have a high melting temperature because the case of the battery would not function as intended if the gasket melted prior to the safety vent functioning to release the buildup of internal pressure.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the battery housing of Takahashi et al. in order to provide a safety venting mechanism to prevent explosion.

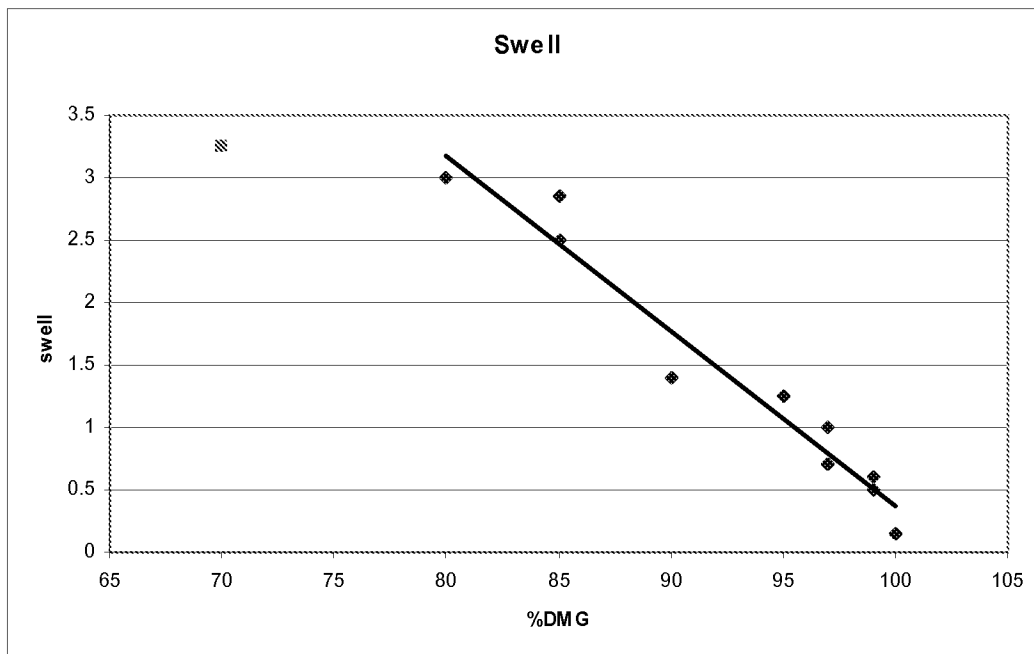
Response to Arguments

9. Applicant's arguments filed August 5, 2008 have been fully considered but they are not persuasive.

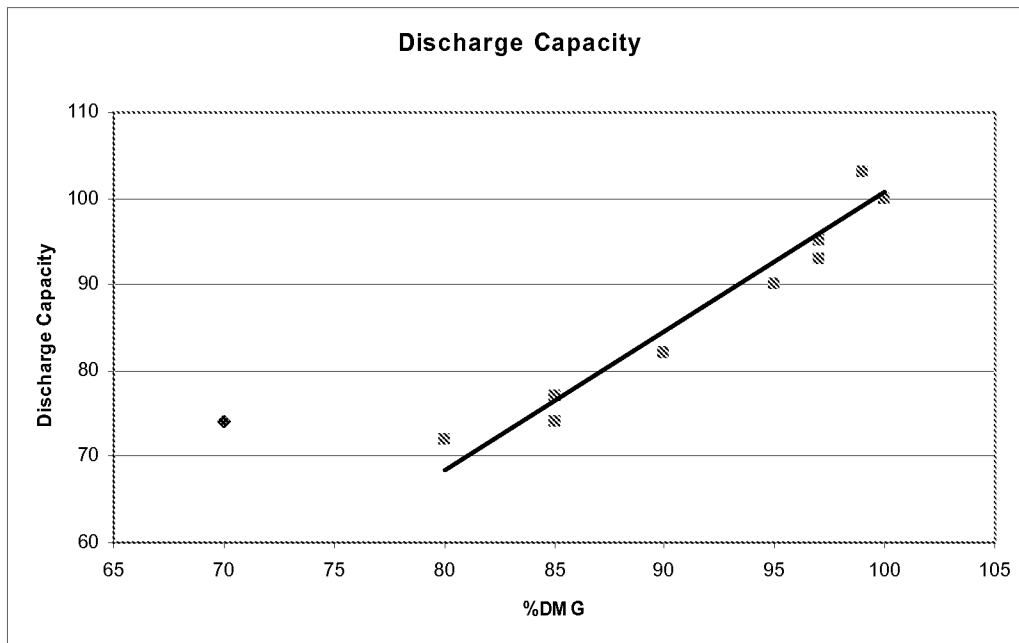
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Beginning on page 5, Applicant argues that the invention as claimed provides unexpected results. The examiner disagrees.

In the Affidavit filed August 5, 2008, data of "comparative examples" has been provided. The examiner has reviewed the data and graphs that are found on page 4 of the affidavit. The examiner has also made graphs using the same data, seen below:



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Based on a different linear regression line that includes BOTH the "comparative examples" and data from within the claimed ranges, it is clearly seen that a predictable result occurs. If Applicant still believes that the results are unexpected, data points in the range of 85-90% DGM would provide more data to be included in the calculation of the regression lines. As the data stands, the examiner is not at all convinced of Applicant's argument of unexpected results. If anything, the results at the data point of 70% DGM are unexpected, while the results within 80% to 100% DGM are predictable.

As for Applicant's arguments that the combination of Hamrock et al. and Funatsu would not have been obvious, the examiner is not convinced. While Funatsu does teach that the battery can be charged and discharged below room temperature, it is not taught that the battery is used exclusively at those temperatures. Certainly, one of ordinary skill in the art would recognize that the batteries of Funatsu are not meant to be used only at temperatures below room temperature, but have the added advantage of being usable

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at those temperatures. Further, one of ordinary skill in the art might want to provide a battery with the advantage of being usable below room temperature at some times if not at all times, and use the teachings of Funatsu to provide added characteristics to the battery. Additionally, Applicant is reminded of the comment on page 7 of the Remarks filed August 5, 2008, in the first sentence of the second full paragraph, where it is stated that "Funatsu teaches electrolyte solutions that are *excellent* in battery performance over a *wide temperature range*" (emphasis added by examiner).

Regarding Applicant's argument that it would not have been obvious to combine the teachings of Sano et al. and Funatsu, the examiner is not convinced. First, the teachings of Sano et al. relied upon in the rejection are of the separator, not the electrolyte. Second, the examiner does not understand the argument to low boilers. The rejection relies on the teachings of Funatsu of a subsidiary component of the non-aqueous electrolyte, since Hamrock et al. teach the chain carbonate of instant claim 1. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 8-5:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1795

aee